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# Immunization Registries to Exchange Data Using HL7

***A report by: Susan Abernathy; HL7 Board of Directors; National Immunization Program, Centers for Disease Control and Prevention***

A new implementation guide for data exchange entitled, "Immunization Data Transactions Using the Health Level Seven (Version 2.3.1) Standard Protocol," June 1, 1999, is now available and promises to benefit both developers of immunization registries and software vendors. This guide is the culmination of collaboration by six immunization registry developers and managers who are ready to test data exchange with each other. The guide defines the messages in detail, showing how they are able to carry a rich amount of immunization data. Equally important, however, the new guide also defines the "minimum message" needed for a billing system to extract the core data elements and send them to an Internet account or save to a file, creating an unsolicited batch of updates to the immunization histories in a registry. The minimum message consists of the core demographic and vaccine event data elements plus values in all the additional HL7-required fields.

The registries involved in producing this guide (California, San Bernardino (in CA, but with a separate, privately funded registry), Georgia, Illinois, Michigan and New York State) had developed their own individual implementation plans, but now intend to implement this common standard. In addition, staff from both Kaiser Permanente and the Indian Health Service participated in conference calls and draft reviews as the work proceeded. These organizations provided new viewpoints to the effort, which was initiated by the National Immunization Program (NIP) of the Centers for Disease Control and Prevention (CDC). As other immunization registries evolve to be ready for data exchange outside their boundaries, NIP intends to coordinate any additional data

needs through HL7 so that over time there will remain one nationally consistent implementation of Immunization messaging for those who choose to participate.

## Catalyst for the Guide

The guide is a result of a meeting in the fall of 1998, when representatives of the six immunization registries shared information about how each one planned to implement the HL7 Version 2.3 immunization messages. Each of the six registries had produced an implementation guide describing how they would implement the HL7 messages. NIP staff charted each field as described by each registry to allow easy and visible comparisons of the differences. Many minor and some major differences were evident. For example, one registry planned to carry the birth name in one field and the current name, if different, in another field. The other registries had these reversed. Several registries also had designed Z-segments to carry information they had not seen a standard way to send. Others had developed their own code tables for user-defined codes. Even though some of the table elements were similar the codes varied among registries that defined their own. It was apparent that communication among these registries would not be seamless and that an opportunity existed to create an implementation guide that could meet everyone's needs and at the same time form the basis for a national standard.

The registries agreed that all would benefit if they adhered to one national standard implementation guide that could be available both for registries to use and for software vendors to build into, the provider systems they produce. One vendor explained that, with one national imple-

mentation, software vendors would be more ready to incorporate it into the clinical or computer-based patient record systems they were building or upgrading. Another vendor advised that, even though his product was strictly a billing system, he believed it would be possible to build a "patch" that could extract the needed data and save it to a file as services were performed in the clinic. At the end of the day, a batch of records could be forwarded to the registries, thus eliminating the need for duplicate data entry. A nationally standard implementation that allows vendors to assure their customers of compatibility with all registries and that meets the needs of all registries will save time in the development cycle that might have been allocated to attempting to solve data exchange issues in isolation.

## The Recent Standards Work

From fall 1998 through spring 1999, NIP staff addressed each of the issues raised by representatives of the six registries and developed a method for reporting them within the Version 2.3.1 standard. When new codes were needed for tables already in the standard, NIP staff requested the additions from the relevant chapter work groups within HL7. Version 2.3.1 contains some of these additions, and others will be in Version 2.3.2. As additional registries decide to leverage the work of this group, further changes likely will be needed from HL7. Besides the new fields and codes added to the HL7 standard itself, NIP staff requested and received new LOINC codes. These codes allow more specialized reporting of clinical data related to the vaccine event, such as the dose number of each component of a combination vaccine or a contraindication to the vaccine that is due.

## The Need for Registries

NIP participates in this effort as part of its support for the development and maintenance of computerized immunization registries as an essential resource to provide the information needed to improve and sustain high levels of immunization coverage. Several factors frequently work together to cause missed opportunities to vaccinate:

- 1 The recommended immunization schedule is increasingly complex, as new and combination vaccines are developed.
- 2 Providers frequently overestimate the proportion of patients that are fully immunized.
- 3 Most parents do not know the immunization status of their children.
- 4 Most providers do not send parent reminders when a child's immunization is due or recall them when an immunization is missed.
- 5 Physicians frequently do not have access to a child's complete immunization history because of scattered records, created by the increasingly mobile society and the changing nature of healthcare.

Immunization registries can reduce these missed opportunities by making available the information needed to address each of them;

- electronically determining what immunizations are needed at each encounter,
- providing calculations of actual coverage levels,
- producing immunization status reports for parents during child care visits,
- automating the sending of reminder notices to parents,
- bringing together fragmented records to produce one complete immunization history.

## The Challenge

Immunization registries face similar technical challenges to those faced by most of the

healthcare industry today--how to enable communication between numerous disparate systems. Registries have been developed by a number of different entities--managed care organizations, states, cities, counties, and local communities. These developers chose the methods they wished to use within their own systems, but without a coordination point this approach resulted in different hardware, platforms, and applications that need to communicate with each other when a patient moves from one area to another area.

## HL7 as Part of the Solution

NIP recognized the potential importance of HL7 to enable immunization registries to exchange data with each other in 1995. With the help of HL7 members, NIP developed four messages to allow both public and private immunization providers to exchange immunization data with their local or state registry. The messages were designed to communicate the elements in NIP's core data set. The core data set consists of 16 demographic elements used to identify the patient and eight elements that define the vaccine event. The core data set had been developed by consensus of a working group of Immunization grantees and reviewed by the National Vaccine Advisory Committee. The messages are (1) a query for an immunization record (VXQ), (2) a response when multiple matches to the query are found (VXX), (3) a response when the query is matched and a record returned (VXR), and (4) an unsolicited update to an immunization history (VXU). These messages are defined in HL7's Version 2.3 at Sections 4.10 through 4.14 of the standard.

## The Beginning

Most state-based immunization registries were introduced to HL7 in August 1995 at a workshop of registry developers and managers. Dr. Clement McDonald provided the keynote address, giving an

overview of standards and showing the importance of HL7 to clinical reporting. An overview of the messages themselves was presented, and a first implementation guide describing how registries could use the standard messages was distributed by NIP. At the time, most registries were still in the initial stages of planning and working through the issues involved with collecting the needed data and reporting from local registries to a state registry. Most registries planned to address private provider participation at a later date, so the benefit of the HL7 messages did not seem immediate. From that initiation, immunization registries have evolved to the point where 61 of the 64 state or local registries who are immunization grantees are in some stage of registry development or implementation, several have significant private provider participation, and several are ready to test and implement an HL7-based data exchange.

## The Future

Continued collaboration among registries and providers to ensure that implementation plans meet messaging requirements will enable registry developers, vaccination providers, and vendors of physician systems to achieve communication compatibility not available previously. Just as importantly, a national standard that meets the needs of all developers can save time and money in the development cycle that might have been allocated to solve data exchange issues in isolation. The core data set, current vaccine table, current vaccine manufacturers table, and implementation guide are available on the NIP website at [www.cdc.gov/nip/registry](http://www.cdc.gov/nip/registry). For additional information or to provide feedback on this article or the referenced documents, please contact Susan Abernathy or Julie Waddell at (404) 639-8245.

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